

larger diameter. In the embodiments shown, the tube has the larger diameter. The shoulder 33 thus guides the insertion of both parts by limiting the depth of insertion of the tube 20 and hence the receiving cup 10 once the tube 20 has been inserted.

Seals around the peripheries of both the tube and the receiving cup are achieved by sealing ribs 34, 35, 36 in the internal wall of the connecting sleeve. At least one such rib encircles each of the tube and receiving cup. In the preferred embodiment shown, two ribs encircle the tube. All three ribs function both to secure the parts together and to create a fluid-tight seal, permitting fluid passage only in the axial direction through the tube and receiving cup.

The connecting sleeve 30 is preferably of a resilient material such as, for example, silicone rubber.

The components shown in FIGS. 1, 2 and 3 are combined in an assembly 40 in FIG. 4, which shows the assembly installed in a cell designed for tube electrophoresis. The assembly occupies the position normally occupied by a gel-filled tube. Thus, the tube 20 of the assembly is suspended from a plate 41 with a gasket ring seal 42, the plate 41 forming the floor of a portion of the cell holding the upper buffer solution 43. An electrode 44 is immersed in the upper buffer solution 43. The vessel containing the upper buffer solution is typically mounted on a rack which is placed inside a tank containing the lower buffer solution 45. In Figure 4, only the floor 46 of the tank is shown. An electrode 47 is secured to the floor 46 of the tank to be immersed in the lower buffer solution 45.

When the assembly 40 consisting of the tube 20, receiving cup 10 and connecting sleeve 30 are properly mounted, the upper open end 48 of the tube is immersed in the upper buffer solution 43 and the lower end 49 of the receiving cup is immersed in the lower buffer solution 45. Upper buffer solution also fills the tube 20 and receiving cup 10. Electric current from a power supply 50 passes between the electrodes 44, 47, causing electrophoretic migration of molecular species from the support medium 51 (shown here as electrophoresis gel slices) past the frit 21 downward into the receiving cup 10 to collect at the dialysis membrane forming the bottom of the cup. When extraction is complete, the assembly 40 is removed from the cell, and the cup 10 is withdrawn from the connecting sleeve 30. The cup will contain a small amount of buffer solution containing the species in concentrated form. This may be removed in any conventional manner, preferably by pipette.

The foregoing description is offered primarily for purposes of illustration. It will be readily apparent to those skilled in the art that variations and modifications of the structures and methods described herein may be made without departing from the spirit and scope of the invention, as defined by the claims.

What is claimed is:

1. A receiving cup for collecting species electrophoretically extracted from a support medium, said receiving cup comprising:

- a sleeve containing a transverse internal shoulder extending the full circumference thereof;
- a membrane impermeable to said species, sized to rest on said shoulder;
- a gasket of resilient material sized to fit snugly inside said sleeve and to rest on said shoulder above said membrane;

a ring of substantially nondeformable material sized to fit snugly and completely within said sleeve and to rest on said gasket; and

a protrusion on the interior wall of said sleeve of sufficient size to retain said ring, said protrusion positioned to compress said ring, said gasket and said membrane together between itself and said shoulder.

2. A receiving cup in accordance with claim 1 in which said protrusion is a transverse rib extending the full circumference of said sleeve.

3. Apparatus for separating species from a support medium during electrophoretic migration of said species, said apparatus comprising:

a tube closed at one end with a first material permeable to said species and impermeable to said support medium;

a vessel open at the top and closed at the bottom with a second material permeable to water and impermeable to said species;

a sleeve having first and second open ends sized to receive respectively said closed end of said tube and said top of said vessel;

a first rib on the interior wall of said sleeve to engage the exterior of said tube; and

a second rib on the interior wall of said sleeve to engage the exterior of the side wall of said vessel.

4. Apparatus for separating species from a support medium during electrophoretic migration of said species, said apparatus comprising:

a tube closed at one end with a first material permeable to said species and impermeable to said support medium;

a vessel open at the top and closed at the bottom with a second material permeable to water and impermeable to said species; and

a sleeve having first and second open ends sized to receive respectively said closed end of said tube and said top of said vessel, and an internal shoulder to abut the inserted end of one of said tube and said vessel.

5. Apparatus for separating species from a support medium during electrophoretic migration of said species, said apparatus comprising:

a tube closed at one end with a first material permeable to said species and impermeable to said support medium;

a vessel open at the top and closed at the bottom with a second material permeable to water and impermeable to said species, said tube and said vessel being of different outer diameters; and

a sleeve having first and second open ends sized to receive respectively said closed end of said tube and said top of said vessel, and an internal shoulder to abut the inserted end of the larger diameter one of said tube and said vessel.

6. Apparatus for separating species from a support medium during electrophoretic migration of said species, said apparatus comprising:

a tube closed at one end with a first material permeable to said species and impermeable to said support medium;

a vessel open at the top and closed at the bottom with a second material permeable to water and impermeable to said species;

a sleeve having first and second open ends sized to receive respectively said closed end of said tube and said top of said vessel; and